# 11737  Extreme Primitive Society

Do not be misled by the name. Primitive society is a community of very advanced intelligent unisexual beings, called the primitives. The reason that they are called primitives is that they are all primitive geometric shapes, rectangles. Every member of the primitive society have two genetic traits, $width(w)$ and $height(h)$, both can be expressed as positive integers. The primitive society have in fact so advanced in science and technology that, now they reproduce only through the means of genetic engineering. Their reproduction system works as follow.

Two primitives deposit their gene samples in a Generation Creating Machine (GCM). The GCM then performs genetic engineering tasks to produce up to 4 offspring. Say the parent primitives had genetic traits $(w_1, h_1)$ and $(w_2, h_2)$ respectively. Then the 4 offspring would have genetic traits $(w_1, h_1)$, $(w_2, h_2)$, $(w_1, h_2)$ and $(w_2, h_1)$ respectively.

After this, a mutation is performed but this is optional and GCM decided this randomly. The mutation process is defined as the incrementing or decrementing of $h$ value by 1 and / or incrementing or decrementing of $w$ value by 1. And thus, a new generation of primitives is born. See fig. for better understanding of the procedure.
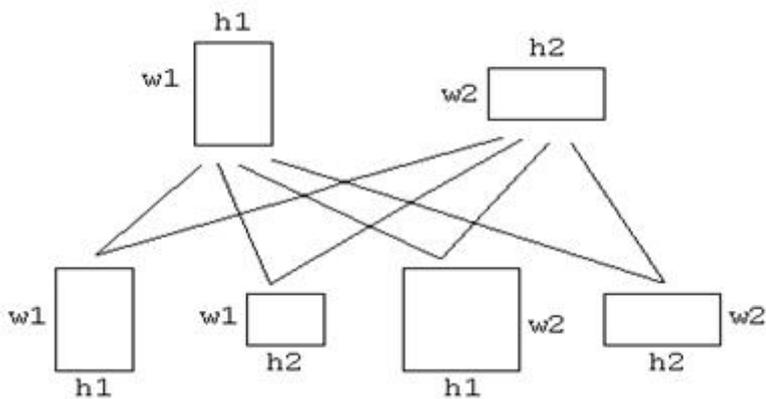


Due to their scientific advancements, the primitives have become immune to everything except the weather change. Therefore, they do not need to reproduce very often to ensure survival of their species. Once in ten years or so they deposit their gene samples to the GCM. Say there are $n$ people in the current generation, then the GCM uses the genes from every individual of the current generation with every other individual performing $n(n-1)/2$ mating. The GCM can also apply mutation on some of the resulting offspring to increase their fitness. A primitive is considered absolutely fit if both of its genetic traits have same value, i.e. the rectangle is a square.

Note that, although $n(n-1)/2$ mating are performed, at most $2n(n-1)$ offspring are born in the next generation. Why up to $2n(n-1)$, not exactly $2n(n-1)$? Because they dont have any need for people with redundant genetic configurations and the GCM makes sure that only one person of each possible genetic configuration will remain in the society.

Given an initial population of primitives, your job is to calculate the minimum number of generations should pass before an absolutely fit individual is born in this society.

## Input

There will be multiple test Cases, not more than 1010. Each case starts with an integer $n$ ($\geq 2$) on a line by itself. This is the number of individuals in the initial population. Following will be $n$ lines, each

having 2 positive integers representing the genetic configuration of each individual of the society. All numbers will be positive integers not exceeding 100.

## Output

For each test case of input, print one line of output beginning with 'Case $x$ : ' where $x$ is the test case number. This text should be followed by the minimum number of generations required before an absolutely fit individual is born in this society.

## Sample Input

```
3
35 40
30 35
32 44
3
35 68
70 1
79 25
```

## Sample Output

```
Case 1 : 1
Case 2 : 1
```